IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Nowak et al. Examiner: M. Jackson

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For: COMPOSITE WRAP MATERIAL

Assistant Commissioner of Patents
Washington, D.C. 20231

Response to Office Action

The following is in response to the Office Action mailed November 6, 2002. Applicant includes the Third Declaration of Thomas Bezigian. Mr. Bezigian has reviewed the present patent application and all of the references cited by the Examiner. (Bezigian Declaration Para 1).

The Examiner has rejected claims 1, 5, 6, 10 and 12 as being anticipated by Lacy, 3,480,464. The Examiner states that Lacy teaches a wrapping or packaging material comprising an extrusion coated paper wherein a polyolefin layer is extruded onto a paper substrate and then a thin layer of material is vapor deposited on the polyolefin layer (Abstract; Col. 4, lines 10-55). Lacy teaches that any type of paper and paper thickness can be employed as the substrate such as processed papers like Kraft paper and that the polyolefin layer is preferably polyethylene (Col. 3, lines 3-72). Lacy teaches that the paper, polyolefin or metal layer can be provided with beneficial adhesion promoting agents such as a coating layer of PEI (Col. 4, line 64- Col. 5 line 9). Lacy further teaches examples comprising a paper having a basis weight within the instantly claimed range, a polyethylene extruded layer on the paper having a PEI adhesion promoting layer on the surface and metallizing the polethylene layer (Examples).

Lacy relates to a metallic laminate wrapping or packaging material for food stuffs and other commercial products like liquid shampoo, hair cream dye solvent, sour cream and liquid chlorine bleach. This product replaces heavier aluminum foil wraps that are stiff and bulky in appearance and more costly due to a heavier amount of aluminum foil. The object of Lacy is to create a lighter weight, flexible, metallic laminate structure having good appearance and moisture/vapor barrier akin to aluminum foil. (Bezigian Declaration Para 2).

The product of Lacy comprehends any weight and type of base paper, but the lighter basis weight is preferred. The laminated product involves coating the base paper with a liquid polymer then cooling and solidifying it with a chill roll. The polymer layer makes the surface smooth for depositing a lustrous metal layer or coating polymer layer in a vacuum metallizer. Molten polymer is then extruded over the metal layer in the same way as the first polymer layer. The structure is thin (1-2 mls) and relatively easy to heat seal. The polyolefin/polymer layers are applied in a molten state as high temperatures (550-600 degrees). (Bezigian Declaration Para 3).

The claims of the present invention do not require a metallized layer, having a solid film layer laminated to the paper layer and have heavier paper basis weights. Lacy requires a metallized layer; the polymer layer is applied in the molten state and the wrap is designed for wrapping liquid or food stuffs. Lacy requires a paper coated with polyolefin/vapor deposited metal/polyolefin. Adhesion promoting agents are placed between the layers. Further, Lacy adds the polyolefin layer in a molten state which then must be cooled and solidified. (Bezigian Declaration Para 4).

For the above reasons, claims 1, 5, 6, 10 and 12 are not anticipated nor obvious over Lacy.

Lacy relates to a wrapping or packing material that is produced by coating a paper substrate with a polyolefin, vapor depositing a thin layer of metal onto the polyolefin coating and then depositing a polyolefin coating over the metal layer. Adhesion promoting agents, such as polyalkyleneimines, and oxidizing treatments are employed.

Lacy provides a composite laminate structure comprising a first or substrate layer of paper, a second layer of a film-forming non-aromatic hydrocarbon olefin polymer uniformly deposited over said first paper layer, a third layer of a metal uniformly deposited over said second layer of olefin polymer, and a fourth layer of a film-forming non-aromatic hydrocarbon olefin polymer uniformly deposited over said third layer of metal.

The structure of Lacy is prepared by first extrusion coating the paper substrate with the olefin polymer by expelling a molten sheet or screen of the polymer on the paper web and immediately cooling and solidifying the olefin polymer layer by contacting it with a smooth shiny chill roll. This provides a smooth, uniform coating of olefin polymer susceptible to having deposited thereon a smooth lustrous metal layer or coating by passing the polymer coated paper through a suitable vacuum metallizer. After the metal layer is uniformly deposited over the polyolefin layer, a second layer of an olefin polymer is deposited over the metal layer by extrusion coating a molten layer of the olefin polymer over the metal in the same fashion as the polymer coating is applied over the paper.

The polyolefin can be applied to the paper substrate or surface of the metal deposit, whichever is applicable, from an extruder adapted to expel a falling sheet-like layer or curtain of molten polyolefin through a suitable die orifice onto the paper or metal surface. It is advantageous to maintain the polyolefin in the extruder, particularly when it is polyethylene, at a temperature sufficiently high to ensure its remaining in a fused and molten condition after being passed from the die to fall through the air as a layer on the surface to be coated. Immediately upon being applied, the polyolefin layer from the molten sheet is chilled, solidified and laminated in place by the action of a shiny chill roll.

The deposit of the metal coating over the polyolefin layer is obtained by thermal evaporation or cathodic sputtering methods. In one embodiment, a sheet of the polyolefin coated paper is placed in or passed through a high-vacuum chamber such that the polyolefin surface is in apposition to a grid, coil, powder, sheeting, or other form of the metal to be employed in the coating. The metal is heated by suitable heating grids, trays, coils or other heating apparatus to volatilize the metal, whereupon it condenses as a thin deposit on the polyolefin surface. Any metal capable of being vacuum metallized can be utilized in the practice of the invention. After being provided with the coating of metal, the composite structure of paper/polyolefin/metal is then processed through a second polyolefin extrusion to apply over the metal deposit a layer of polyolefin, which may be the same or a different polyolefin than that is applied over the paper.

The Examiner has rejected claims 1, 5, 6, 9 and 10 as being anticipated by Eberl, 3,010,860. The Examiner states that Eberl teaches a composite wrapping material comprising a paper base sheet with a basis weight of 16-32 lb. ream weight, coated with

an adherent hot melt wax coating and then covered with a synthetic resin sheet such as polyethylene or polypropylene wherein the wax is a refined paraffin wax or microcrystalline wax, i.e., polymer wax (Abstract, Col. 2-Col. 3 line 12, Col. 3 lines 20-47).

Eberl relates to a film laminate that can be made with or without a supporting base paper. The final product is used for wrapping food and has good moisture and vapor barrier properties. Eberl requires wax paper adapting a covering film of synthetic resin to at least one side. This is accomplished by feeding together the wax paper at room temperature and the sheet of film at a temperature that is higher than both the softening point of the resin and the melting point of the wax. The wax and the softened plastic commingle and cohere, thereby creating a moisture/vapor barrier. (Bezigian Declaration Para 5).

Eberl provides a composite protective material wherein a discrete film of thermoplastic resinous polymer which is compatible with hydrocarbon wax and also film of hydrocarbon wax are united in such a manner as to create at their interface an intermediate layer of commingled polymer and wax imparting superior physical properties to the composite product. The finished product has the synthetic film adhered to the wax film through the medium of commingling of materials at the interface between the films. (Bezigian Declaration Para 6).

In an embodiment of Eberl, film is extruded in a heated form and then covered by a layer of hydrocarbon wax. The heating effects a blending of the resin and wax at their interface. The blending of the wax and poly forms the adhesion between the film and the paper board. (Bezigian Declaration Para 7).

A further embodiment of Eberl comprises a composite of resin and wax films free of a supporting paper base. The film is covered with a film of paraffin wax and heated to a temperature sufficient to accomplish the blending of the material at their interface, while the major portion of the film integrity is retained. (Bezigian Declaration Para 8).

The claims of the present invention require a composite of paper and solid film; does not require the heating and blending of layers for adhesion, rather an adhesive is used to laminate the separate layers of paper and film; does not use a wax coating, and is not used for food wrap. (Bezigian Declaration Para 9).

Eberl does not require the paper layer; requires the heating or blending of layers for adhesion; requires a wax coating; and is used for food wrap. (Bezigian Declaration Para 10).

For the reasons stated above claims 1, 5, 6, 9 and 10 are not anticipated nor obvious over Eberl.

Eberl provides a composite material wherein a discrete film of thermoplastic resinous polymer which is compatible with hydrocarbon wax and also a film of hydrocarbon wax are united in such a manner as to create at their interface an intermediate layer of commingled polymer and wax imparting superior physical properties to the composite product. One embodiment of the sheet is an adaptation of wax paper. Such a waxed paper may consist of a base sheet of paper formed from chemical and/or semi-chemical pulps, carrying a firmly adherent, substantially continuous coating of wax on each surface. The wax of the coating may be a refined paraffin wax, a microcrystalline wax or any other mineral wax.

Conversion of this waxed paper into the packaging material entails the application of a covering film of synthetic resin to at least one side thereof. In a preferred method, a die in communication with the extruder is provided with an aperture through which is discharged film forming resin material as a relatively thin sheet of substantial width. The sheet flows continuously from the die and is drawn, with further attenuation into the nip between the pressure roll and the cooling roll. The waxed paper is also fed between the rolls in a manner which permits the sheet to contact one of the wax coatings. Preferably, the waxed paper is at room temperature whereas the sheet is supplied at a temperature which is above the softening point of the resin as well as the melting point of the wax film.

As the heated sheet comes into contact with the wax coating, the wax melts at the surface permitting the wax and the synthetic resin, under the thermally induced solvation action, to blend at the interface while the films are firmly cohered on passage through the nip of the rolls. As the composite assembly continues to advance in contact with the cooling roll, the plastic materials set and further migration of wax into the resin or commingling between the resin and wax is halted.

The sheet may be preformed and unrolled from a parent roll supported near the nip. In such event, the sheet as it is fed from the parent roll, should be heated so as to be at a proper temperature for drawing to the desired thickness as it enters the nip of the rolls and to admit of bonding of one of the wax coatings or upon contact therewith.

The wax coatings of the paper base are formed of hydrocarbon waxes, including both the natural and synthesized waxes. Other polyolefins, such as polypropylene and polybutylene, which may be cast of extruded in film form may be applied to paper. The

finished product has the synthetic film adhered to the wax film through the medium of a commingling of materials at the interface between the films.

In a second embodiment, a film of a synthetic resin, a polyolefin is applied and secured to a heavy base of paper board. Conveniently, the synthetic resin film is extruded upon the paper board. A film of hydrocarbon wax is superimposed on the film by dip waxing or roll coating as is conventional and the composite assembly is subjected to heat for a time sufficient to effect a blending of the two films at their interface.

The Examiner has rejected claims 1, 5, 6, 8, and 11 as being anticipated by Kitagawa, 4,242,418. The Examiner states that Kitagawa teaches a polyolefin-paper composition comprising a styrene-butadiene acrylic copolymer as an adhesive layer between the polyolefin layer and the paper substrate; wherein the polyolefin layer comprises polyethylene and may further comprise pigments and wherein Kitagawa teaches examples comprising a paper basis weight of 100 g/m2 which reads on about 60 lbs/3,000 sq. ft. as instantly claimed (Abstract; Col. 5 lines 34-64; Col. 6, lines 7-33; col. 7 line 63- col. 8, line 27; Examples).

Kitagawa relates to a polyolefin laminate product that is used for photographic papers and comprises: a base paper of basis weight 100-180 g/m2 that is coated or impregnated during the paper making process with a copolymer primer and then can be optionally subjected to corona discharge treatment. The coated base paper is then subjected to an extrusion coating of a polyolefin layer. The object of Kitagawa is to enhance the adhesion between the paper and polyolefin layers by treating the paper prior to extrusion coating and replaces the so-called dry lamination process of uniting paper and a polyolefin film with an adhesive. (Bezigian Declaration Para 11).

Kitagawa relates to a polyolefin-paper laminate comprising (a) a base paper, (b) a copolymer of (1) at least one diene monomer and (2) at least one monovinyl substituted aromatic compound incorporated into or coated on the base paper and (c) an extrusion coated polyolefin layer thereon. (Bezigian Declaration Para 12).

Kitagawa further relates to a polyolefin-paper laminate comprising a base paper and a copolymer of (1) at least two diene monomer and (2) at least one monovinyl-substituted aromatic compound incorporated into or coated on the base paper subjected to a corona discharge treatment and having a polyolefin layer extruded thereon.

Kitagawa relates to light sensitive photographic papers; the plastic film layer is extruded in molten form; primers are required on the surface of the paper; and the photographic papers contemplated do not incorporate a paper/solid film lamination. Kitagawa requires polyolefin paper laminate base paper, copolymer of at least one diene mnomer and at least one monovinyl substituted aromatic compound incorporated into or coated on the base paper and an extrusion coating polyolefin layer thereon. The present invention has the plastic film layer processed in the solid state and incorporates a paper/solid film lamination. (Bezigian Declaration Para 13).

For the reasons stated above claims 1, 5, 6, 8 and 11 are not anticipated nor obvious over Kitagawa.

Where the copolymer composition is employed in use, various emulsion latexes, and water soluble high molecular weight materials can be incorporated therein in order to prevent excessive permeation of copolymer composition into the base paper and to control viscosity improving the coating capability and further to increase adhesion. For the purpose of enhancing adhesion between the paper and the polyolefin, it is desired that

these primers be present on the surface of paper. Therefore while it is possible to incorporate the copolymer during the production of the paper, it is preferred for the copolymer to be applied to surface of the paper at a final step in producing the paper or immediately before the extrusion coating of the polyolefin layer on the paper.

The term polyolefin refers to a homopolymer of an alpha olefin having 2 to 8 carbon atoms, such as ethylene, propylene, butylene, isobutylene, isoprene, amylene and the like; a copolymer comprising two or more alpha olefins, such as ethylene, propylene.

The Examiner has rejected claims 1, 5 and 6 as being anticipated by Knauf, 5,250,348. The Examiner states that Knauf teaches an improved wrapper paper for use in wrapping reams of paper wherein the wrapper comprises a base paper of about 30-about 60 lbs/3,000 sq. ft.; a LDPE layer and wherein an optionally PEI layer can be applied to the paper web prior to application of the PE layer to enhance adherence of the PE to the paper web. (Abstract; Col. 2 lines 64-67; Col. 3, lines 20-46; Col. 4, lines 21-47; Col. 8, lines 45-53; Figures).

Knauf relates to a bifacial wrapper for pressure sensitive products, i.e., ream wrap for carbonless printing papers. One side of a base paper is either printed or non-printed and extrusion coated with LD polyethylene; the other side of the paper is coated with PEI coating or primer. The primer coat enhances low pressure/heat sealing of the ream wrap at the points where the opposite sides of the paper interface. The PEI layer can be done either before or after the poly extruded layer. In an embodiment, the base paper has a thin layer of polyethylene disposed on at least the side margins of the opposite side of the paper. These marginal areas of the wrapper are subjected to temperatures of 520-590

degrees, and the weight of the wrapped product is sufficient to effect a seal. (Bezigian Declaration Para 14).

The claims of the present invention relate to a laminated product whereby a sheet of solid plastic film and a base paper are adhered using an adhesive. Knauf teaches that the plastic resin is extruded in molten form. Knauf further teaches that the paper has on one of its flat surfaces a layer of polyethylene and on the opposite side of its flat surfaces a layer of primer selected from polyalkyleneimine class. (Bezigian Declaration Para 15).

For the reasons stated above claims 1, 5 and 6 are not anticipated nor obvious over Knauf.

Knauf relates to a wrapper paper for pressure sensitive products bearing on one of its flat surfaces a layer of polyethylene and on the opposite side of its flat surfaces a layer of a primer selected from the polyalkyleneimine class, at least portions of the opposite flat coated surfaces facing one another in overlapping relationship when the paper is wrapped about a product, the overlaying areas of the wrapper paper being sealed to one another by heat means and the application of very low pressure to the overlapping portions.

Very low pressure sealing of a polyethylene-coated wrapper paper in encapsulating relationship about a product is effected by applying to that surface of the wrapper paper opposite the polyethylene layer, a primer layer of a material selected from the polyalkyleneimine group, and thereafter subjecting the outermost of overlaid marginal areas of the wrapper paper, while in position about the product, to a temperature of between about 520 F and 590 F for a time period of between 1 and 1.5 seconds and with the application of about 0.04 lb/in2 pressure to the overlaid area sought to be sealed.

This provides for simultaneous heating of the polyalkyleneimine-bearing layer and the adjacent and underlying LDPE layer to the extent that with the application of the amount of pressure exerted by the actual weight of the wrapped product can be sufficient to effect the desired seal. The invention provides a wrapper paper comprising a base paper web of wrapping paper having a thin layer of polyethylene disposed at least on the side margins of one flat surface of the paper web and a thin layer of polyalkyleneimine disposed on at least the side margins of the opposite flat surface of the paper web.

One embodiment includes a supply roll of base paper which is fed forwardly and onto a flat surface thereof there is laid an optional layer of PEI from a conventional PEI applicator followed by extrusion of a layer of polyethylene onto the PEI layer by means of a conventional extruder. As the web is fed forwardly through the process, there is deposited on that surface thereof opposite the polyethylene-carrying surface, a layer of a polyalkyleneimine.

The Examiner has rejected claims 1, 5, 6, 11 and 12 as being anticipated by Hirose, 4,584,234. The Examiner states that Hirose teaches a wrapping material comprising laminated layers of a paper support and at least one polyethylene resin layer superimposed on at least one surface of the paper support, and at least one layer of said wrapping material optionally comprising a light-shielding substance such as in the form of aluminum deposited on the surface of the paper. (Abstract; Col, 4, lines 16-19; Figures). Hirose teaches that an adhesive layer can be utilized between the paper support and the extruded polyethylene layer to improve adhesiveness (Col. 4, lines 41-55). Hirose further teaches an example utilizing a machined paper having a basis weight of 70 g/m2 which falls within the instantly claimed range.

Hirsose relates to wrapping materials for photographic materials, especially light-shielding papers for wrapping photographic roll films used as backing papers. The product comprises a base paper laminated to a blended resin layer on at least one side of the paper by extrusion-lamination method. A light-shielding substance in powder, film or foil form is added to any of the laminated layers. For instance, metallic foil may be laminated on the paper using adhesive. Several embodiments are comprehended: (1) a paper with a blended poly layer (added with an adhesive) on each side and a light-shielding substance added to one of the poly layers; (2) a paper layer with blended poly on either side or both sides, the light-shielding layer applied without adhesive; and (3) a laminated structure having a two-layer paper support. (Bezigian Declaration Para 16).

Hirose relates to wrapping materials for photographic materials comprising laminated layers of a paper support and at least one thermoplastic resin layer superposed on at least one surface of said paper support; said thermoplastic resin layer comprises a blended resin of (a) a high-density polyethylene having a density of 0.950 g/cm3 or more and a melt index of 10-40 and (b) a low-density polyethylene having a density of 0.930 g/cm3 or less and a melt index of 1-40, the weight ratio of (b)/(a) being 70/30-5/95, preferably 70/30-20/80, more preferably 60/40-40/60. (Bezigian Declaration Para 17).

The claims of the present invention require that the product is used for wrapping reams of paper; requires that a solid plastic film layer is laminated to the paper using an adhesive and requires a basis weight of 20-60 lbs. Hirose requires that the product is used for photographic films; requires light shielding elements; involves extrusion lamination of the poly layer and does not teach the basis weights claimed in the present invention. (Bezigian Declaration Para 18).

For the reasons stated above claims 1, 5, 6, 11 and 12 are not anticipated nor obvious over Hirose.

Hirose relates to wrapping materials for photographic materials, especially to light-shielding papers for photographic roll films used as backing paper. The invention comprises a paper support and at least a blended resin layer comprising a high density polyethylene (HDPE) and a low-density polyethylene (LDPE), said resin layer being laminated on said support. For providing light-shielding ability to wrap material, at least one layer of the wrapping material contains a light shielding substance in an amount of 1.0-3.0 g/m2. An aluminum foil or a deposited aluminum foil (light shielding substance layer (6)) is provided on the surface of paper, or a light shielding layer is printed (7).

Other layers which are necessary for light-shielding papers may additionally be laminated, for example, a protective layer may be superposed on a printed surface, the paper support may be comprised of a laminated sheet, and an adhesive may be added for improving adhesiveness. Any further known techniques may be imparted to the polyethylene layer, for instance, coating of an adhesion accelerator on the surface of the paper for the purpose of improving the adhesiveness of said paper upon extrusion lamination, corona-discharge, flame-treatment.

The Examiner has rejected claim 1, 5, 6 and 8-11 as being obvious over Hyde, 2,582,037 in view of Eberl. The Examiner states that Hyde teaches a wax coated wrapping paper comprising a paper base with a wrapping weight of 15-150 lbs/ream (3,000 sq ft), preferably 20-35 lbs/ream, and a polyethylene wax blend coating applied to the paper base (Abstract; Columns 2-3). Hyde does not teach polyethylene film applied over the wax coating, however, Eberl teaches that by providing a thermoplastic film such

as polyethylene film over the wax coating and heating to adhere the film to the wax provides improved physical properties to the composite paper wrapping product over wax coated papers (Col. 1 lines 40-56; Col. 3, lines 48-63). Therefore, one would have been motivated to apply a polyethylene or other compatible thermoplastic film as taught by Eberl over the waxed paper substrate taught by Hyde to provide improved physical and mechanical properties to the paper composite. Further, it would have been obvious to provide the desired pigments on any of the composite layer to provide a desired color based on a particular end use of the composite.

Hyde relates to a flexible wrapping paper for food and consumer products that can be coated on traditional wax applying apparatus. A blend of microcrystalline wax modified by solid polyethylene is applied to a base paper. (Bezigian Declaration Para 19).

Hyde does not teach the basis weight of the paper and does not make it obvious. Hyde uses a hot/melt waxing and not the lamination of a solid film to the base paper. (Bezigian Declaration Para 20).

For the reasons stated above claims 1, 5, 6, and 8-11 are not anticipated nor obvious over Hyde in view of Eberl.

Hyde relates to a wax-type coating composition containing a relatively high percentage of micro-crystalline wax, the characteristics of which are modified by incorporation of polyethylene therewith to render the wax suitable for coating. Micro-crystalline wax can be adapted as a coating material for paper by blending it with polyethylene with which it is entirely compatible in a wide range of proportions, and which improves the toughness and hardness of the resultant composition compared to the

micro-crystalline wax alone, and prevents blocking in the roll or stack of paper so coated which would otherwise occur as a result of the micro-crystalline wax.

Applicant believes that the application is now in condition for allowance.

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Signature: _____

Name: Maureen P. Herbst

Respectfully submitted,

Philip Weiss

Philip M. Weiss
Reg. No. 34,751
Attorney for Applicant
Weiss & Weiss
310 Old Country Rd., Ste. 201
Garden City, NY 11530
(516) 739-1500